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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/443,447	11/22/1999	JEI-WEI CHANG	HT98-034	7263

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EXAMINER

LAVILLA, MICHAEL E

ART UNIT	PAPER NUMBER
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1775

DATE MAILED: 05/19/2003

16

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.
09/443,447

Applicant(s)
CHANG ET AL.

Examiner
LA VILLA

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE three MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Apr 14, 2003
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above, claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 and 25-36 is/are rejected.
- 7) ☒ Claim(s) 24 is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
*See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s). _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:
2. The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
3. Claims 33-35 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
 - I. Regarding Claim 33, it is unclear what is meant by the phrase "said seed layer formed of a selected from the group." Are there missing words?
 - II. Regarding Claims 34 and 35, it is unclear what is meant by the phrase "buffer layer comprised of NiO." Is the word "is" missing?

Claim Rejections - 35 USC § 102

- (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:
5. A person shall be entitled to a patent unless –
6. (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 1, 7-14, 34, and 35 are rejected under 35 U.S.C. 102(e) as being anticipated by Kamiguchi USP 6,303,218. Kamiguchi teaches spin valve structures, wherein a substrate is coated with a buffer layer, base crystal layer, an iron oxide crystal growth controlling layer, a free magnetic layer of the spin valve, and the remainder of the claimed spin valve structure. The crystal structure and lattice constants of the crystal growth controlling layer are chosen to be close to those of the base crystal layer and free magnetic layer, whose crystal structures and lattice constants are to be identical. See Kamiguchi (col. 6, lines 48-66; col. 7, lines 53-58; col. 8, lines 21-58; col. 10, lines 21-39; col. 12, lines 47-64; and Examples 2, 3-7, 26, and 27). Kamiguchi does not describe the iron oxide as having alpha structure. However, according to Kamiguchi, the iron oxide of Kamiguchi is supposed to have crystal structure and lattice constants comparable to that of the base crystal layer, which may be Ni₈₀Fe₂₀. Applicant teaches that alpha iron oxide possesses the same structure and comparable lattice constants with respect to Ni₈₀Fe₂₀. Therefore, it would be expected that the iron oxide of Kamiguchi inherently comprises alpha iron oxide.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:
- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

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Patentability shall not be negated by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148

USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. Claims 1-6, 8-23, and 25-36 are rejected under 35 U.S.C. 103(a) as being

obvious over Horng et al. USP 6,292,336. Horng et al. exemplifies a substrate coated with NiCr alloy seed layer, NiO buffer layer, and NiFe free layer in a MR sensor element. See Horng (Abstract; col. 5, lines 46 through col. 6, line 37; col. 7, lines 12-32; col. 7, line 53 through col. 8, line 65; col. 9, lines 34-51; col. 10, lines 13-34; col. 12, lines 37-51; and Examples). Horng teaches but does not exemplify the claimed structures of a seed layer of the claimed materials, NiO buffer layer, an optional spacer layer, free layer, spacer layer, pinned layer, antiferromagnetic layer, and cap layer or making of such structures, as effective spin valve devices. Horng also teaches that effective spin valves may comprise a pinned layer of the claimed three-layered variety. It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate the structures suggested by Horng by forming on NiO an optional spacer layer, a free layer, a spacer layer, a pinned layer, an antiferromagnetic layer, and a cap layer, as Horng teaches that the resulting laminates form effective spin valve devices.

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It would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate said structure with a three-layered pinned layer as Horng teaches that effective spin valves may obtain this structure. While Horng does not explicitly teach the claimed requirement of lattice and structure matching between the buffer metal oxide layer and the free layer, the materials utilized by Horng are identical to applicant's preferred NiO and NiFe materials that achieve applicant's claimed required matching. Hence, the claimed requirement would be expected to be inherently achieved.

11. The applied reference has a common inventor with the instant application.

Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November

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29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(I)(1) and § 706.02(I)(2). J.W. Chang appears to be a common inventor.

12. Claims 1, 4, 5, 7-14, 34, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamiguchi USP 6,303,218. Kamiguchi teaches spin valve structures, wherein a substrate is coated with a buffer layer, base crystal layer, an iron oxide crystal growth controlling layer, a free magnetic layer of the spin valve, and the remainder of the claimed spin valve structure. The crystal structure and lattice constants of the crystal growth controlling layer are chosen to be close to those of the base crystal layer and free magnetic layer, whose crystal structures and lattice constants are to be identical. See Kamiguchi (col. 6, lines 48-66; col. 7, lines 53-58; col. 8, lines 21-58; col. 10, lines 21-39; col. 12, lines 47-64; and Examples 2, 3-7, 26, and 27). Kamiguchi does not describe the iron oxide as having alpha structure. However, according to Kamiguchi, the iron oxide of Kamiguchi is supposed to have crystal structure and lattice constants comparable to that of the base crystal layer, which may comprise Ni₈₀Fe₂₀. Applicant teaches that alpha iron oxide possesses the same structure and comparable lattice constants with respect to Ni₈₀Fe₂₀. Therefore, it would be expected that the crystal growth controlling layer comprises alpha iron oxide. In

the event that the exemplified laminates do not contain the required lattice and structure matching between the crystal growth controlling layer and the free layer, it would have been obvious to one of ordinary skill in the art at the time of the invention to fabricate articles having close lattice constants and structures with respect to the crystal growth controlling layer and free magnetic layer as Kamiguchi teaches that this arrangement provides for effective magnetic elements. It would have been obvious to one of ordinary skill in the art at the time of the invention to use any of the claimed magnetic and conductor layer materials of the claimed thicknesses as Kamiguchi teaches using such materials and thicknesses as effective for forming magnetic sensor elements. It would have been obvious to one ordinary skill in the art at the time of the invention to use a synthetic pinned layer as claimed in the laminate of Kamiguchi as Kamiguchi teaches that spin valves having such synthetic pinned layers are effective.

Double Patenting

13. Applicant is advised that should claim 18 be found allowable, claim 36 will be objected to under 37 CFR 1.75 as being a substantial duplicate thereof. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k). Claim 36 claims the same seed layer materials as Claim 18.

Response to Amendment

- I. In view of applicant's amendments and arguments, applicant has traversed the section 112, first and second paragraph rejections of the Office Action mailed on 8 January 2003. Rejections are withdrawn.
- II. Newly discovered reference to Horng et al. USP 6,292,336 is applied to claims previously indicated as allowable over the prior art.

Allowable Subject Matter

14. Claim 24 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Neither the reviewed prior art nor the prior art of record teach or suggest the subject matter of Claim 24, namely, the claimed article having an alpha iron oxide metal oxide layer of the claimed thickness.

CONCLUSION

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael La Villa whose telephone number is (703) 308-4428. The examiner can normally be reached on Monday through Friday.

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16. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Deborah Jones can be reached on (703) 308-3822. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

17. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Michael La Villa
May 18, 2003

A handwritten signature in black ink, appearing to read 'Michael La Villa', written in a cursive style.